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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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EXAMINER

PHAM, TUAN

ART UNIT	PAPER NUMBER
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2643

DATE MAILED: 06/07/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/068,780

Applicant(s)

APFEL, RUSSELL J.

Examiner

TUAN A PHAM

Art Unit

2643

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 02/06/2002.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-42 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☒ Claim(s) 33-42 is/are allowed.
- 6) ☒ Claim(s) 1-32 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____

DETAILED ACTION

Claim Rejections - 35 USC § 103

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

2. Claims 1-32 are rejected under 35 U.S.C. 103(a) as being unpatentable over Randahl (U.S. Patent No.: 5,734,712) in view of Caesar (U.S. Patent No.: 5,333,194).

Regarding claim 1, Randahl teaches a passive echo cancellation circuit for reducing echoes on a subscriber line, comprising:

an output driver adapted to drive a downstream signal on the subscriber line (see figure 1, amplifier A, col.3, ln.20-30),

first sensing circuitry coupled to the output driver and being adapted to sense a current on the subscriber line to generate a first voltage (see figure 1, R2, col.3, ln.13-54),

second sensing circuitry adapted to sense a current in the portion of the downstream signal passing through the balancing network to generate a second voltage (see figure 1, R4, col.3, ln.13-54), and

an upstream driver adapted to subtract the second voltage from the first voltage to generate an upstream signal (see figure 1, differential amplifiers 1, col.1, ln.40-54)

(e.g., the differential driver 1 have the different voltage output V1 and V2, then they cancel or subtract the echo to generate the upstream signal).

It should be noticed that Randahl fails to clearly teach a balancing network adapted to receive at least a portion of the downstream signal. However, Caesar teaches such feature (see figure 2A, balance network 24, col.5, ln.4-45) for a purpose of adjusting the impedance of the telephone network.

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to incorporate the use of balancing network adapted to receive at least a portion of the downstream signal, as taught by Caesar, into view of Randahl in order to improve the echo in the communication network.

Regarding claims 2, 13, and 22, Caesar further teaches the circuit wherein the balancing network comprises a balancing loads corresponding to an expected load on the subscriber line (see figure 2A, capacitor 68, col.5, ln.35-40).

Regarding claims 3, 14, and 23, Randahl further teaches the circuit wherein the balancing network further comprises a protection resistor (see figure 1, protection resistor RS1).

Regarding claim 4, Randahl further teaches the circuit wherein the output driver, first and second sensing circuitries, and upstream driver are contained in a subscriber line interface circuit chip (see figure 1, sensing circuit R2, R4, driver A, driver 1, SLIC PBL3764).

Regarding claim 5, Caesar further teaches the circuit wherein the balancing networks is external to the subscriber line interface circuit chip (see figure 1, balance network 24, SLIC 12).

Regarding claims 6 and 15, Randahl further teaches the circuit wherein the first sensing circuitry comprises a sensing resistor coupled between the output driver and the subscriber line (see figure 1, sensing resistor R2, col.3, ln.20-25).

Regarding claim 7, Randahl further teaches the circuit wherein an output terminal of the sensing resistor is coupled to the upstream driver to provide the first voltage (see figure 1, sensing resistor R2, driver 1, col.3, ln.20-50).

Regarding claims 8 and 16, Randahl further teaches the circuit wherein the second sensing circuitry comprises a sensing resistor coupled between the output driver and the balancing network (see figure 1, sensing resistor R4, col.3, ln.34-40).

Regarding claims 9 and 17, Randahl further teaches the circuit wherein an output terminal of the sensing resistor is coupled to the upstream driver to provide the second voltage (see figure 1, sensing resistor R4, driver 1, col.3, ln.20-50).

Regarding claims 10 and 18, Randahl further teaches the circuit wherein the first sensing circuitry comprises a first sensing resistor coupled between the output driver and the subscriber line, an output terminal of the resistor is coupled to the upstream driver to provide the first voltage, the second sensing circuitry comprises a second sensing resistor coupled between the output driver and the balancing network, and an output terminal of the second sensing resistor is coupled to the upstream driver to provide the second voltage (see figure 1, R2, R4, drivers A, differential amplifiers 1,

col.3, ln.13-54) (e.g., the differential driver 1 have the different voltage output V1 and V2, then they cancel or subtract the echo to generate the upstream signal).

Regarding claim 11, Randahl further teaches the circuit wherein the subscriber line interface circuit chip comprises an output terminal coupled to the subscriber line, and the circuit further comprises a protection resistor coupled between the output terminal and the subscriber line (see figure 1, protection resistor RS1, SLIC PBL3764 chip, telephone set).

Regarding claims 12 and 21, Randahl teaches a method and apparatus of line card for coupling to a subscriber line, comprising:

a subscriber line interface circuit adapted to drive a downstream signal on the subscriber line and receive an upstream signal on the subscriber line, the subscriber line interface circuit comprising (see figure 1):

a first output terminal coupled to the subscriber line (see figure 1, output driver A, telephone set),

an output driver coupled to the output terminal and adapted to drive the downstream signal on the subscriber line (see figure 1, output driver A, telephone set),

first sensing circuitry coupled to the output driver adapted to sense a current on the subscriber line to generate a first voltage (see figure 1, sensing circuit R2, driver A, col.3, ln.20-50),

second sensing circuitry adapted to sense a current in the portion of the downstream signal passing through the balancing network to generate a second voltage (see figure 1, sensing circuit R4, driver A, col.3, ln.20-50) and

an upstream driver adapted to subtract the second voltage from the first voltage to generate the upstream signal (see figure 1, differential amplifiers 1, col.1, ln.40-54) (e.g., the differential driver 1 have the different voltage output V1 and V2, then they cancel or subtract the echo to generate the upstream signal).

It should be noticed that Randahl fails to clearly teach a second output terminal couple to balancing network adapted to receive at least a portion of the downstream signal to the balancing network. However, Caesar teaches such feature (see figure 2A, balance network 24, col.5, ln.4-45) for a purpose of adjusting the impedance of the telephone network.

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to incorporate the use of a second output terminal couple to balancing network adapted to receive at least a portion of the downstream signal to the balancing network, as taught by Caesar, into view of Randahl in order to improve the echo in the communication network.

Regarding claim 19, Randahl further teaches the line card subscriber line interface circuit further comprises a protection resistor coupled between the second output terminal and the subscriber line (see figure 1, protection resistor RS2).

Regarding claim 20, Randahl further teaches the line card wherein the subscriber line interface circuit further comprises an amplifier coupled to the echo

cancellation circuit and being adapted to amplify the upstream signal (see figure 1, amplifier UUAB, SLIC, col.3, ln.54-67).

Regarding claim 24, Randahl further teaches the method wherein driving the downstream signal comprises driving the downstream signal with an output driver (see figure 1, driver A, telephone set) (the output of driver A is driving the downstream signal to telephone set).

Regarding claim 25, Randahl further teaches the method wherein sensing the current on the subscriber line comprises providing a sensing resistor between the output driver and the subscriber line (see figure 1, driver A, sensing resistor R2, telephone set, col.3, ln.13-53).

Regarding claim 26, Randahl further teaches the method wherein sensing the current on the subscriber line comprises coupling an output terminal of the sensing resistor to an upstream driver to provide the first voltage (see figure 1, driver A, driver 1, sensing resistor R2, telephone set, col.3, ln.13-53).

Regarding claim 27, Randahl further teaches the method wherein sensing the current in the portion of the downstream signal passing through the balancing network comprises providing a sensing resistor between the output driver and the balancing network (see figure 1, driver A, driver 1, sensing resistor R4, telephone set, col.3, ln.13-53).

Regarding claim 28, Randahl further teaches the method wherein sensing the current in the portion of the downstream signal passing through the balancing network comprises coupling an output terminal of the sensing resistor to an upstream driver to

provide the second voltage (see figure 1, driver A, driver 1, sensing resistor R4, telephone set, col.3, ln.13-53).

Regarding claim 29, Randahl further teaches the method wherein sensing the current on the subscriber line comprises providing a first sensing resistor coupled between the output driver and the subscriber line, an output terminal of the resistor being coupled to an upstream driver to provide the first voltage, and sensing the current in the portion of the downstream signal passing through the balancing network comprises providing a second sensing resistor coupled between the output driver and the balancing network, an output terminal of the second sensing resistor being coupled to the upstream driver to provide the second voltage (see figure 1, R2, R4, drivers A, differential amplifiers 1, col.3, ln.13-54) (e.g., the differential driver 1 have the different voltage output V1 and V2, then they cancel or subtract the echo to generate the upstream signal).

Regarding claim 30, Randahl further teaches the method wherein providing the second sensing resistor comprises providing the second sensing resistor having a resistance equal to a multiple of the resistance of first sensing resistor (see col.3, ln.20-50). It is obvious based on design choice, by choosing the value of the resistance to the range as claimed would not involve any inventive feature since it is just a matter of selecting the value of the sensing resistor for a purpose of limiting the power to the downstream signals.

Regarding claim 31, Randahl further teaches the method wherein providing the second sensing resistor comprises providing the second sensing resistor having a resistance equal to about 100 times the resistance of first sensing resistor. It is obvious based on design choice, by choosing the value of the resistance to the range as claimed would not involve any inventive feature since it is just a matter of selecting the value of the sensing resistor for a purpose of limiting the power to the downstream signals.

Regarding claim 32, Randahl further teaches the method further comprising amplifying the upstream signal (see figure 1, amplifier UUAB, col.3, ln.54-64).

Allowable Subject Matter

3. Claims 33-42 are allowed.

Conclusion

4. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. In order to expedite the prosecution of this application, the applicants are also requested to consider the following references. Although Zobel et al. (U.S. Patent No. 4,431,874), Eriksson et al. (U.S. Patent No. 6,700,975), Patel et al. (U.S. Patent No. 5,175,764), and Enriquez (U.S. Patent No. 6,400,187) are not applied into this Office Action; they are also called to Applicants attention. They may be used in future Office Action(s). These references are also concerned for supporting the system

and method for balancing current multiplier circuit for a subscriber loop interface circuit and differential current sense inputs and single ended voltage output.

5. Any inquiry concerning this communication or earlier communications from the examiner should be directed to **Tuan A. Pham** whose telephone number is (703) 305-4987. The examiner can normally be reached on Monday through Friday, 8:00 AM-5:00 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Mr. Curtis Kuntz can be reached on (703) 305-4708 and

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Art Unit 2643
May 27, 2004
Examiner

Tuan Pham



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